

WHAT IS CLAIMED IS:

1. An amine-extended polyetherurethaneurea (PEUU) elastomer comprising the reaction product of:
 - a) an isocyanate-terminated prepolymer having a free NCO group content of from about 1 to about 2%, which is the reaction product of,
 - (i) a stoichiometric excess of at least one isocyanate,
 - (ii) an isocyanate-reactive component containing a blend of a glycol and one or more ultra-low monol diols having a molecular weight of at least about 4,000 Da and an unsaturation of less than about 0.010 meq/g, and optionally,
 - (iii) a catalyst;
- 5 with
- 10 b) a mixture of at least about 40 mole % of ethylene diamine (EDA) and up to about 60 mole % of at least one aliphatic, asymmetric co-diamine,
- 15 wherein reaction of a) and b) is carried out in a polar, aprotic solvent.
- 20 2. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the glycol is chosen from tripropylene glycol (TPG), dipropylene glycol (DPG), propylene glycol (PG), polypropylene glycol (PPG) and polytetramethylene ether glycol (PTMEG).
- 25 3. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the blend has a number average molecular weight of between about 2,000 Da and about 9,000 Da.
- 30 4. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the blend has a number average molecular weight of between about 2,300 Da and about 3,700 Da.

5. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the one or more ultra-low monol diols has a molecular weight of at least about 6,000 Da.
- 5 6. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the one or more ultra-low monol diols has a molecular weight of at least about 8,000 Da.
- 10 7. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the glycol is tripropylene glycol (TPG).
8. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the unsaturation of the one or more ultra-low monol diols is less than about 0.007 meq/g.
- 15 9. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the unsaturation of the one or more ultra-low monol diols is less than about 0.005 meq/g.
- 20 10. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the at least one isocyanate is chosen from 1,2-ethylene diisocyanate, 1,3-propylene diisocyanate, 1,4-butylene diisocyanate, 1,6-hexylene diisocyanate, 1,8-octylene diisocyanate, 1,5-diisocyanato-2,2,4-trimethylpentane, 3-oxo-1,5-pentane diisocyanate, 25 isophorone diisocyanate, the cyclohexane diisocyanates, hydrogenated tetramethylxylylene diisocyanate, hydrogenated toluene diisocyanates, hydrogenated methylene diphenylene diisocyanates, toluene diisocyanates, the methylene diphenylene diisocyanates and the polymethylene polyphenylene polyisocyanates.

11. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the at least one isocyanate is 4,4'-methylene diphenylene diisocyanate (4,4'-MDI).
- 5 12. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the mixture b) contains about 50 to about 90 mole % of ethylene diamine (EDA) and about 10 to about 50 mole % of at least one aliphatic, asymmetric co-diamine.
- 10 13. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the mixture b) contains about 60 to about 80 mole % of ethylene diamine (EDA) and about 20 to about 40 mole % of at least one aliphatic, asymmetric co-diamine.
- 15 14. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the at least one aliphatic, asymmetric co-diamine is chosen from isophorone diamine (IPDA), 1,2-diaminopropane (PDA), 2-methylpentamethylenediamine, xylene diamine and 1,3-diaminocyclohexane.
- 20 15. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the at least one aliphatic, asymmetric co-diamine is 1,2-diaminopropane (PDA).
- 25 16. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the at least one aliphatic, asymmetric co-diamine is 2-methylpentamethylenediamine.
- 30 17. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the at least one aliphatic, asymmetric co-diamine is isophorone diamine (IPDA).

18. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1, wherein the polar, aprotic solvent is chosen from dimethyl acetamide (DMAc), dimethyl formamide (DMF), dimethyl sulfoxide (DMSO), N-methyl pyrrolidone (NMP).

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19. The amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1 further including one or more additives chosen from anti-oxidants, UV stabilizers, anti-tack agents, dyes and pigments.

10 20. A process for making an amine-extended polyetherurethaneurea (PEUU) elastomer comprising:
reacting

15 a) an isocyanate-terminated prepolymer having a free NCO group content of from about 1 to about 2 %, which is the reaction product of,
(i) a stoichiometric excess of at least one isocyanate,
(ii) an isocyanate-reactive component containing a blend of a glycol and one or more ultra-low monol diols having a molecular weight of at least about 4,000 Da
20 and an unsaturation of less than about 0.010 meq/g,
and optionally,
(iii) a catalyst;
with
b) a mixture of at least about 40 mole % of ethylene diamine (EDA) and up to about 60 mole % of at least one aliphatic, asymmetric co-diamine,
25 in a polar, aprotic solvent, and
collecting the reaction product.

30 21. The process according to Claim 20, wherein the glycol is chosen from tripropylene glycol (TPG), dipropylene glycol (DPG), propylene glycol

(PG), polypropylene glycol (PPG) and polytetramethylene ether glycol (PTMEG).

22. The process according to Claim 20, wherein the blend has a
5 number average molecular weight of between about 2,000 Da and about
9,000 Da.
23. The process according to Claim 20, wherein the blend has a
10 number average molecular weight of between about 2,300 Da and about
3,700 Da.
24. The process according to Claim 20, wherein the one or more ultra-
low monol diols has a molecular weight of at least about 6,000 Da.
- 15 25. The process according to Claim 20, wherein the one or more ultra-
low monol diols has a molecular weight of at least about 8,000 Da.
26. The process according to Claim 20, wherein the glycol is
20 tripropylene glycol (TPG).
27. The process according to Claim 20, wherein the unsaturation of the
one or more ultra-low monol diols is less than about 0.007 meq/g.
28. The process according to Claim 20, wherein the unsaturation of the
25 one or more ultra-low monol diols is less than about 0.005 meq/g.
29. The process according to Claim 20, wherein the at least one
isocyanate is chosen from 1,2-ethylene diisocyanate, 1,3-propylene
30 diisocyanate, 1,4-butylene diisocyanate, 1,6-hexylene diisocyanate, 1,8-
octylene diisocyanate, 1,5-diisocyanato-2,2,4-trimethylpentane, 3-oxo-1,5-
pentane diisocyanate, isophorone diisocyanate, the cyclohexane
diisocyanates, hydrogenated tetramethylxylylene diisocyanate,

hydrogenated toluene diisocyanates, hydrogenated methylene diphenylene diisocyanates, toluene diisocyanates, the methylene diphenylene diisocyanates and the polymethylene polyphenylene polyisocyanates.

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30. The process according to Claim 20, wherein the at least one isocyanate is 4,4'-methylene diphenylene diisocyanate (4,4'-MDI).

10 31. The process according to Claim 20, wherein the mixture b) contains about 50 to about 90 mole % of ethylene diamine (EDA) and about 10 to about 50 mole % of at least one aliphatic, asymmetric co-diamine.

15 32. The process according to Claim 20, wherein the mixture b) contains about 60 to about 80 mole % of ethylene diamine (EDA) and about 20 to about 40 mole % of at least one aliphatic, asymmetric co-diamine.

20 33. The process according to Claim 20, wherein the at least one aliphatic, asymmetric co-diamine is chosen from isophorone diamine (IPDA), 1,2-diaminopropane (PDA) and 2-methyl-pentamethylenediamine, xylene diamine and 1,3-diaminocyclohexane.

34. The process according to Claim 20, wherein the at least one aliphatic, asymmetric co-diamine is 1,2-diaminopropane (PDA).

25 35. The process according to Claim 20, wherein the at least one aliphatic, asymmetric co-diamine is 2-methylpentamethylenediamine.

36. The process according to Claim 20, wherein the at least one aliphatic, asymmetric co-diamine is isophorone diamine.

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37. The process according to Claim 20, wherein the polar, aprotic solvent is chosen from dimethyl acetamide (DMAc), dimethyl formamide (DMF), dimethyl sulfoxide (DMSO), N-methyl pyrrolidone (NMP).

5 38. The process according to Claim 20 further including adding one or more additives chosen from anti-oxidants, UV stabilizers, anti-tack agents, dyes and pigments.

10 39. In a method of making one of a medical glove, a scientific glove and a condom, the improvement comprising including the amine-extended polyetherurethaneurea (PEUU) elastomer according to Claim 1.

40. One of a medical glove, a scientific glove and a condom made by the process according to Claim 39.

15 41. An isocyanate-terminated prepolymer having a free NCO group content of from about 1 to about 2 %, which is the reaction product of,
(i) a stoichiometric excess of at least one isocyanate,
(ii) an isocyanate-reactive component containing a blend of a
20 glycol and one or more ultra low monol diols having a molecular weight of at least about 4,000 Da and an unsaturation of less than about 0.010 meq/g,
and optionally,
(iii) a catalyst.

25 42. The isocyanate-terminated prepolymer according to Claim 41, wherein the glycol is chosen from tripropylene glycol (TPG), dipropylene glycol (DPG), propylene glycol (PG), polypropylene glycol (PPG) and polytetramethylene ether glycol (PTMEG).

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43. The isocyanate-terminated prepolymer according to Claim 41, wherein the blend has a number average molecular weight of between about 2,000 Da and about 9,000 Da.

5 44. The isocyanate-terminated prepolymer according to Claim 41, wherein the blend has a number average molecular weight of between about 2,300 Da and about 3,700 Da.

10 45. The isocyanate-terminated prepolymer according to Claim 41, wherein the one or more ultra-low monol diols has a molecular weight of at least about 6,000 Da.

15 46. The isocyanate-terminated prepolymer according to Claim 41, wherein the one or more ultra-low monol diols has a molecular weight of at least about 8,000 Da.

47. The isocyanate-terminated prepolymer according to Claim 41, wherein the glycol is tripropylene glycol (TPG).

20 48. The isocyanate-terminated prepolymer according to Claim 41, wherein the unsaturation of the one or more ultra low monol diols is less than about 0.007 meq/g.

25 49. The isocyanate-terminated prepolymer according to Claim 41, wherein the unsaturation of the one or more ultra low monol diols is less than about 0.005 meq/g.

50. The isocyanate-terminated prepolymer according to Claim 41, wherein the at least one isocyanate is chosen from 1,2-ethylene diisocyanate, 1,3-propylene diisocyanate, 1,4-butylene diisocyanate, 1,6-hexylene diisocyanate, 1,8-octylene diisocyanate, 1,5-diisocyanato-2,2,4-trimethylpentane, 3-oxo-1,5-pentane diisocyanate, isophorone

diisocyanate, the cyclohexane diisocyanates, hydrogenated tetramethylxylylene diisocyanate, hydrogenated toluene diisocyanates, hydrogenated methylene diphenylene diisocyanates, toluene diisocyanates, the methylene diphenylene diisocyanates and the 5 polymethylene polyphenylene polyisocyanates.

51. The isocyanate-terminated prepolymer according to Claim 41, wherein the at least one isocyanate is 4,4'-methylene diphenylene diisocyanate (4,4'-MDI).

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52. The isocyanate-terminated prepolymer according to Claim 41 further including one or more additives chosen from anti-oxidants, UV stabilizers, anti-tack agents, dyes and pigments.

15 53. In a method of making one of a medical glove, a scientific glove and a condom, the improvement comprising including the isocyanate-terminated prepolymer according to Claim 41.

54. One of a medical glove, a scientific glove and a condom made by 20. the process according to Claim 53.